

MEMORANDUM

Agenda Item 4

To: Board of Regents
From: Board Office
Subject: Annual Report on Technology Transfer and Economic Development
Date: December 1, 2004

Recommended Actions:

1. Receive the report on technology transfer and economic development.
2. Direct that this report and copies of complete institutional reports (included in the Regent Exhibit Book) be forwarded to the Secretary of the Senate, the Chief Clerk of the House of Representatives, and the Legislative Fiscal Bureau by January 15, 2005.

Executive Summary:

The Regent universities promote the economy of Iowa primarily by providing higher education to the people of the state. The universities also strengthen the Iowa economy through development of the state's workforce, conducting research that results in intellectual property and applications in the marketplace, providing assistance to Iowa businesses and communities, and attracting and retaining industry. The Regent universities collaborate in a variety of initiatives aimed at promoting economic development. In addition, the research undertaken at the Regent universities' and the external support it attracts invigorate the Iowa economy.

The report also provides brief background concerning the Regent universities' activities supported through direct budget allocations. These directly supported enterprises nevertheless constitute a small part of the wide range of Regent university projects and services that promote economic development in Iowa.

Background:

The broader context of Economic Development and the Regent Universities

The Regent universities promote the economy of Iowa primarily by providing higher education to the people of the state. In addition to on-campus undergraduate, graduate, and professional degree programs, the Regent universities are important providers of distance and continuing education for people in the workforce. By providing higher education, the Regent universities help to sustain both high productivity and high-wage employment in Iowa, both of which are critical to the state's economic well-being. Additionally, the Regent universities hire people for well-paying jobs, support state and local tax bases, spend in and attract money to local and state economies, and contribute to an overall climate and quality of life which attract and retain business.

The focus of this report

This report focuses on the more purposeful and targeted ways in which the Regent universities promote the economy of Iowa. These include:

- workforce development;
 - the creation of intellectual property;
 - advancing ideas for market applications;
 - supporting the creation of new companies;
 - offering assistance to existing companies;
 - providing technical assistance to Iowa communities;
 - attracting new companies to the state.
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Outline of this report

This report briefly describes the Regents universities' contribution to the economic development and technology transfer in terms of the following categories of activities:

- I. Research and Technology Transfer

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- II. Research Parks and Business Incubation
 - III. Other Technical Assistance
 - IV. Major Collaborations for Economic Development
 - V. Economic Development Appropriations FY 2001-2005

I. Research and Technology Transfer

The fundamental purpose of the research undertaken by the Regents universities is to expand the horizons of human knowledge and possibility. As contributions to science, the research activities of the Regent universities' promote the well-being of the whole of society.

Academic research contributes to the Iowa economy

Nevertheless, the universities' research efforts, including the management of intellectual property and the transfer of new technologies for broader application, also make a vital contribution to the economy of the state. The research undertaken at the Regent universities' and the external support it attracts invigorate the Iowa economy.

External support attracted by the Regent Universities supports 15,590 jobs

According to a U.S. Commerce Department Bureau of Economic Analysis multiplier, \$433 million in external support for research at the Regent universities supported 15,590 jobs in FY 2004¹. Aggregate FY 2004 revenue to Iowa companies as a result of Regents university licensed technologies (i.e., sales reported by Iowa companies of products and services based on licensed inventions) amounted to \$21.4 million.

Examples of achievements in technology transfer at the Regents universities include:

Some technology transfer achievements

- In FY04, the University of Iowa achieved a record high 47 options/licenses executed and a record high 46 patents issued.
- In FY04 the University of Iowa achieved a record high \$10,734,275 in intellectual property earnings.
- In FY04 the University of Iowa received \$333.3 million in sponsored funding. Of this sum, \$30.4 million came from corporations.
- In FY04, Iowa State University obtained a record \$274.2 million in sponsored funding from federal and non-federal sources. Of this amount, \$12.6 million came from businesses and commodity groups for research activities and \$12.7 million for non-research activities, including many projects that provide technical support and outreach to companies in Iowa.
- Total sales of ISU research foundation-licensed technologies (excluding germplasm) were \$68.7 million.
- The University of Northern Iowa's technology transfer efforts have spun out several companies into the regional economy.
- UNI's Intellectual Property Committee to date has reviewed disclosures leading to 18 patents, 3 provisional patents, 31 international patents, and 9 memorandums of understanding.

Table 1 provides statistics

Table 1 (on the following page) presents indicators related to intellectual property and aggregate external support for FY 2003 and FY 2004.

¹ "These job figures include both full- and part-time jobs. They also include jobs supported directly on campuses and jobs supported indirectly outside campuses as institutional expenditures ripple through local and state economies." Source: AAU memorandum, Employment Impacts of Academic R&D, August 19, 2003.

Table 1: Intellectual Property and Aggregate External Support FY 2003 – FY 2004

Indicators	FY 2003				FY 2004			
	ISU	SUI	UNI	Regents Total	ISU	SUI	UNI	Regents Total
1. Number of disclosures of intellectual property	134	75	1	210	110	86	3	199
2. Number of patent applications filed	37	101	2	140	52	118	3	173
3. Number of patents issued	27	39	2	68	27	46	2	75
4. Number of license and option agreements executed on institutional intellectual property	187	42	2	231	166	47	1	214
5. Number of license and option agreements yielding income	437	177	6	620	362	164	5	531
6. Royalties/license fee income	\$6,820,000	\$8,762,838	\$26,320	\$15,609,158	\$2,800,000	\$10,734,275	\$25,695	\$13,559,970
7. Revenue to Iowa companies as a result of licensed technologies ²	\$14,800,000	\$1,506,526	\$890,000	\$17,196,526	\$18,000,000	\$740,779	\$2,660,000	\$21,400,779
8. Total sponsored funding	\$230,400,000	\$352,319,990	\$18,071,000	\$600,790,990	\$274,217,384	\$333,299,508	\$23,735,500	\$631,252,392
9. Sponsored funding for research	\$148,000,000	\$279,320,212	\$1,750,000	\$429,070,212	\$163,075,683	\$267,547,634	\$2,433,400	\$433,056,717
10. Corporate-sponsored funding for research and economic development ³	\$26,400,000	\$33,274,148	\$3,214,000	\$62,888,148	\$25,254,584	\$30,383,055	\$1,756,800	\$57,394,439
11. Iowa special appropriations for economic development and technology transfer	\$2,424,161	\$253,338	\$370,555	\$3,048,054	\$2,369,617	\$247,638	\$362,217	\$2,979,472

² Aggregate sales reported by Iowa companies of products and services based on licensed inventions.

³ Excludes corporate philanthropy.

Research parks provide support to new businesses

Some examples of successes in supporting businesses and technology innovation

II. Research Parks and Business Incubation

The Regent universities support business and job creation in part through business and technology incubation. The Regent universities' incubators provide new companies with guidance through the start-up process, connections to the respective universities, affordable space, reception services, office equipment, conference rooms, and other amenities at reasonable rates.

Examples of Regents university achievements in business and technology incubation include:

- The 39 active Iowa companies affiliated with the University of Iowa's Technology Incubation Center and Oakdale Research Park employ 1,231 people earning an average salary of more than \$49,000. Employees come from 22 counties and 83 cities and towns.
- In FY04, the UI Office of Corporate Partnerships worked with 29 Iowa companies, organized seven on-campus visits by Iowa businesses and facilitated interactions between business representatives and UI researchers, technology transfer personnel and career placement officers.
- The UI Center for Biocatalysis and Bioprocessing (CBB) expanded collaborations with industry in Iowa and worldwide and advanced plans for a cGMP manufacturing facility.
- Five new companies and affiliates have joined the ISU Research Park in FY04, bringing the historic total of affiliated companies to 139. These companies employ more than 1500 people. Currently, there are 48 companies located in the Park, employing over 750 people.
- A study of the ISU Research Park has indicated that tenants contribute \$134.2 million both directly and indirectly to the state's industrial output.
- Wages paid by the ISU Research Park companies exceed \$36.7 million annually.
- During its three years of operation, UNI's Regional Business Center has launched 15 businesses and graduated 8 into approximately 17,000 square feet of commercial space in downtown Waterloo.
- UNI's MyEntreNet program provides virtual incubator services to eight rural Iowa counties.
- UNI's two incubator programs have launched 46 new ventures which in turn have created more than 154 jobs.

Universities provide technical support to industry and Iowa communities

Some examples of achievements in technical assistance

III. Other Technical Assistance

In addition to the support provided by the research parks, numerous other Regent university programs and projects provide technical assistance and public outreach. Regent university outreach and public service activities for economic development include hands-on technical assistance to businesses and entrepreneurs and direct economic development assistance to Iowa communities.

Examples of Regents university achievements in technical assistance include:

- The University of Iowa's John Pappajohn Entrepreneurial Center served nearly 1,800 students in entrepreneurial courses during the year and received the 2004 National Model Program Award for Excellence in Entrepreneurship Education for undergraduates.
 - SUI's Small Business Development Center provided more than 3,800 hours of assistance including one-on-one technical business services
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to 375 small businesses

- New technologies originating at ISU and licensed to Iowa companies have resulted in \$18.7 million in sales by those companies in calendar year 2003.
- Eight manufacturers that collaborated with ISU's Institute for Physical Research and Technology reported one-time cost savings of more than \$1.22 million,
- One hundred seventy companies served by ISU's Iowa Manufacturing Extension Partnership (IMEP) reported a total of over \$27.5 million on cost savings as a result of IMEP company assistance. Also as a result of these efforts, 170 companies in Iowa reported a combined \$32 million in new investments during the last four quarters, and \$167 million in sales gains.
- UNI's Institute for Decision Making has provided hands-on technical services to 457 community clients. Largely as a result of these services, these clients have created over 1,000 to 1,500 jobs per year over the last decade.
- The UNI John Pappajohn Entrepreneurial Center provided research, consultation and services to 35 business start-ups, and 500 individuals participated in JPEC educational programs. The center helped launch one of the first community-based regional investment funds in Iowa.
- The UNI Regional Business Center/Small Business Development Center provides support services for entrepreneurs in Northeastern Iowa. The center helped launch 46 new business ventures, which created 154 new jobs. Approximately 775 small businesses in nine counties were served through the center's programs.

IV. Major Collaborative Efforts

Universities collaborate for economic development

Regent universities collaborate in a variety of initiatives aimed at promoting economic development. The universities collaborate with one another as well as with such other Iowa entities as Iowa community colleges, the Iowa Department of Economic Development, Iowa Workforce Development, the Department of Natural Resources, Recycle Iowa, USDA Rural Development, and regional and local economic development groups.

A few examples of major collaborative projects

A small number of examples of major economic development collaborative projects include:

Battelle Study

All three Regent universities participated extensively in facilitating the Battelle Memorial Institute's study and road map for Iowa's biosciences. All three universities are active participants in implementing this plan to accelerate the growth of the bioscience industry in Iowa.

Consider Iowa Program

Aimed at workforce development, Consider Iowa offers co-funded student internships with qualifying companies as well as a series of discussion forums. The program was launched by the University of Iowa's Office of Corporate Partnerships, UI Career Center, Engineering Career Services, Technology Innovation Center and Oakdale Research Park .

Highlighting Emerging Careers to High School Students

University of Iowa's Office of Corporate Partnerships facilitated a one-day program for Kirkwood Community College Workplace Learning Connection students from area high schools to visit with emerging Iowa companies and UI Centers of excellence.

For more than a decade the University of Iowa and Iowa State University have been partners with the Iowa Department of Economic Development in a major strategic state presence at the annual international convention of the Biotechnology Industry Organization.

Biologics Facility

This is a significant effort at ISU to initiate the biopharming industry in Iowa through the establishment of a Biologics Facility that can be used to extract from plants critical proteins that have significant pharmaceutical, nutraceutical, and/or industrial applications.

International Economic Development Initiatives in Korea and New Zealand

These efforts, undertaken by ISU together with the Iowa Department of Economic Development and the Greater Des Moines Partnership, have focused on attracting companies to North America.

ABIL Collaboration with ISU-CIRAS/USDA

The University of Northern Iowa's Ag-Based Industrial Lubricants and Iowa State University's Center for Industrial Research and Service are jointly cooperating in the development, commercialization and utilization of bio-based products. The CIRAS database is part of USDA's Federal Bio-based Products Preferred Procurement Program.

IWRC – STAR Training with Community Colleges

UNI's Iowa Waste Reduction Center enjoys strong partnerships with several state agencies, primarily the Iowa Department of Natural Resources and Iowa Department of Economic Development. The IWRC has also collaborated with eleven Iowa community colleges to transfer the Spray Technique Analysis and Research (STAR) Training Program.

IDM and IWD

In 2004, UNI's Institute for Decision Making continued to assist Iowa Workforce Development with its efforts to expand and enhance the use of labor market data by economic development organizations and businesses. Among the outcomes of this ongoing collaboration was a study that won the National Association of State Workforce Agencies' 2004 Labor Market Information Communication Publication Award.

V. Economic Development Appropriations FY 2001 – FY 2005

State appropriations for specific enterprises

This year, as in prior years, state appropriations have been allocated to each of the Regent universities for specific enterprises associated with the promotion of economic development in the state. These enterprises represent a small fraction of the wide range of Regent university projects and services that promote economic development in Iowa. The universities' individual reports (included in the Regent Exhibit Book) provide more information about their respective programs.

Since 2001, appropriations cut 60%

The universities report that reduced appropriations for Regent universities' economic development enterprises have had critical consequences and severely limited the services they provide. For example, as a result of new or increased fees for technical assistance, many rural communities and businesses that cannot pay for technical assistance—often those with the greatest need—are no longer served. Also for example, the Small Business Development Centers, and UNI's Institute for Decision Making and Metal Casting Center have reduced staffing and services. In addition, reductions in state funding have weakened both the universities' capacity to help create and develop new commercial ventures and their ability to attract and retain the researchers that drive intellectual property development.

Table 2 "Economic Development Appropriations FY 2001 – FY 2005" provides an overview of state appropriations and allocations for these projects

for fiscal years 2001-2005. During this period, total appropriations for Regent economic development programs declined from \$7.63 million to \$2.97 million. Re-stated, total state support for Regent universities' economic development in FY 2005 are roughly 39% of those for FY 2001; moreover, these figures are not controlled for inflation.

Table 2: Economic Development Appropriations FY 2001 - FY 2005

	FY 2001 Final Appropriations	FY 2002 Final Appropriations	FY 2003 Final Appropriations	FY 2004 Final Appropriations	FY 2005 Appropriations
University of Iowa					
Center for Advanced Drug Development	275,811	250,774	113,172	110,626	110,343
Oakdale Research Park/Innovation Center	<u>341,021</u>	<u>310,590</u>	<u>140,166</u>	<u>137,012</u>	<u>136,662</u>
Total Economic Development	616,832	561,364	253,338	247,638	247,005
Iowa State University					
Institute for Physical Research & Technology	4,474,108	4,057,557	1,790,657	1,669,627	1,665,325
Small Business Development Centers	1,220,417	1,096,416	474,097	551,375	550,000
Research Park/ISIS	<u>385,271</u>	<u>351,130</u>	<u>159,407</u>	<u>148,615</u>	<u>148,232</u>
Total Economic Development	6,079,796	5,505,103	2,424,161	2,369,617	2,363,557
University of Northern Iowa					
Metal Casting Center	176,861	162,996	70,406	68,822	68,646
Institute for Decision Making	<u>757,098</u>	<u>692,625</u>	<u>300,149</u>	<u>293,395</u>	<u>292,645</u>
Total Economic Development	933,959	855,621	370,555	362,217	361,291
TOTAL	7,630,587	6,922,088	3,048,054	2,979,472	2,971,853

Highlights represent allocations and not appropriated amounts.

Conclusion	This report is a brief summary of complete reports by each of the Regent universities. These are included in the Regent exhibit book. These will be forwarded to the Iowa legislature as part of this report.
Regent Exhibit Book	Each Regent university submitted a comprehensive report concerning technology transfer and economic development to the Board office. The institutions' complete individual reports are included in the Regents exhibit book.
Outline of institutional reports	<p>The universities' reports to the board office are organized according to the following outline</p> <ol style="list-style-type: none"> 1. A narrative description of the relationship of the university's economic development activities to the enhancement of economic growth in the state, including the creation of jobs in Iowa. 2. Statistics on indicators related to intellectual property and aggregate external support. 3. A narrative description of the institution's efforts at outreach and public service for the purposes of economic development. 4. A narrative description of the institution's major collaborative efforts for economic development. 5. A detailed listing of each institution's economic development projects in Iowa, including project descriptions, the Iowa city or cities where this project occurs, and, where possible, the names of businesses or other entities served.
Report to be Forwarded	Following Board action, this report and copies of complete institutional reports will be forwarded to the secretary of the senate, the chief clerk of the house of representatives, and the legislative fiscal bureau by January 15, 2005, as mandated in the Iowa Administrative Code.

_____ Approved: _____
 Anthony G. Girardi Gregory S. Nichols

The University of Iowa (UI) FY2004

B. Overview

The University of Iowa's greatest economic contribution to Iowa's economy is delivering higher education (63.5% of the 29,745 students in fall 2003 were Iowa residents). In addition to on-campus undergraduate, graduate and professional degree programs, UI is an important provider of continuing education for workers and professionals throughout the State. Although the dollars-and-cents value of skilled workers, entrepreneurs and professionals is not easily quantified, a well-educated workforce is essential to strengthening Iowa's economy. UI awarded 5,831 degrees in FY2004.

Some UI academic programs are targeted to directly serve the individual needs of Iowa companies and their managers and professional staff. For example, the UI Tippie School of Management served 746 Iowans enrolled in its MBA for Professionals and Managers graduate degree program offered in Des Moines/Newton, the Quad Cities and Cedar Rapids. The average age of admitted students was 31 (22 – 56 range) with eight years of full-time work experience on average. The students earned undergraduate degrees at 118 different colleges and they worked for 262 different employers including 223 Iowa companies.

The UI is itself an economic engine with an FY2004 budget of \$1.972 billion. The preponderance of UI's budget was earned through sales and services including specialized health care, grants and contracts for research and development, auxiliary enterprises such as residence halls, agency accounts and student tuition and fees. State appropriations provided an essential base of support, although State support declined to 15.2% of the overall UI budget. UI leveraged about \$300 million in State funding to generate nearly \$1.7 billion in earnings and external support.

The UI has become an important employment center with 13,455 non-student workers (faculty, professional/scientific staff and general service staff). Also, the \$333.3 million in external support for research and development activities is recognized as a powerful job creation engine. The U.S. Department of Commerce Bureau of Economic Analysis estimates that for every \$1 million a university receives in external support, 36 jobs are created. The Commerce Department formula suggests that the \$333.3 million in grants and contracts won by UI faculty in FY2004 "rippled through the local and State economy," as the Commerce Department described it, to support 12,000 jobs.

- UI exceeded 1/3 billion dollars in external support for the third consecutive year.
- Corporate sponsored external support was \$30.4 million, exceeding \$30 million for the third consecutive year.

- UI reported 317 corporate sponsored agreements successfully negotiated by the Division of Sponsored Programs and the Clinical Trials Office.

Institutional Activities and Creation of Jobs in Iowa

UI programs and activities facilitate and otherwise enable the creation of jobs in Iowa, although business and industry, not public universities, create private sector jobs.

The UI Technology Innovation Center (TIC) business incubator offers a nurturing environment for new business ventures using advanced technology, while the UI Oakdale Research Park (ORP) offers locations for growing technology companies to establish sustained relationships with the University.

- The 39 active Iowa companies affiliated with TIC and ORP reported 1,231 employees earning an average salary of more than \$49,000 (the four UI anchor laboratories at Oakdale reported another 187 employees).
- The 1,418 employees of TIC/ORP affiliate companies and labs reported living in 22 counties and 83 cities and towns in a regional labor shed covering nearly one-fifth of Iowa.
- Assuming a State income tax rate of 5%, employees of TIC/ORP affiliates paid approximately \$3.5 million in State income taxes in FY04.
- TIC/ORP affiliates reported employing 79 students, and 103 employees had earned doctorates.
- In FY04 the TIC and ORP received a State Special Purpose Economic Development Appropriation of \$136,662 in operating budget support.
- In FY04 the TIC accepted three new tenant companies while two firms met their business goals upon “graduating” from the incubator. The ORP welcomed one new tenant, the bioinformatics division of Coralville biotech firm Integrated DNA Technologies, Inc.

The UI Office of Corporate Partnerships worked in FY04 with 29 Iowa companies, organized seven on-campus visits by Iowa businesses and facilitated interactions between business representatives and UI researchers, technology transfer personnel and career placement officers. OCP took the lead in a new UI initiative called “Consider Iowa” to introduce UI students to career opportunities with Iowa technology companies. New OCP initiatives in FY2004 included:

- Enhance experiential learning opportunities for UI students by designing and managing a series of forums, corporate experiences, and a pilot internship program all focused on the biotechnology industry for the initial year. A cornerstone of the “Consider Iowa” initiative was co-funding student intern stipends through a University-administered grant program.
- Proposal development for the National Science Foundation’s Partnerships for Innovation Program.

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Technology Transfer and Economic Development**

- Iowa-India collaborations which led to exploration of a joint public health training program with the UI college of Public Health and other efforts to promote the UI role in global health partnerships.

The UI Center for Biocatalysis and Bioprocessing (CBB), enabled and supported by State Special Purpose Education Appropriations, expanded collaborations with industry in Iowa and worldwide. In FY2004 the CBB continued planning a cGMP protein processing facility to produce biopharmaceuticals suitable for human use (the CBB lab has already produced vaccines according to those standards for an Iowa company). CBB's annual international conference again brought distinguished biotech researchers from academia, government and industry to Iowa.

- The CBB initiative to produce biopharmaceuticals suitable for use in humans requires a Good Manufacturing Practices (cGMP) facility. CBB's plans for a cGMP production facility are in place. The existing CBB laboratory produced vaccines adhering to these standards for an Iowa vaccine development company, Apovia, Inc.
- A CBB collaboration with Magainin Pharmaceuticals, Inc. involved steps critical to synthesize Squalamine, a potent anti-cancer agent, and production of a purified product.
- CBB assisted a large German pharmaceutical company to develop a multi-step process to produce a polymer from table sugar. The CBB optimized variables, improved yields and reduced fermentation time from 120 to 28 hours.
- CBB contract activity increased for the seventh consecutive year to a record \$650,000.
- CBB is part of the new National Science Foundation Engineering Research Center in Environmentally Beneficial Catalysis. The CBB portion of the joint effort with Washington University in St. Louis and the University of Kansas is \$3.5 million over five years.

The UI Center for Advanced Drug Development (CADD), supported by a State Special Purpose Economic Development Appropriation in the amount of \$110,343, offered specialized non-production services to pharmaceutical companies wishing to bring new productions through clinical trials. A unit of the UI College of Pharmacy, CADD collaborates closely with the College, its Division of Pharmaceutical Service (manufacture of clinical supplies) and the CBB. Importantly, the CADD laboratory resources and expertise are used by the UI University Hygienic Laboratory to augment UHL services to state agencies and private clients.

- The FY2004 client base contracted 250 projects with CADD. Clients included three Iowa companies, six firms from surrounding states, 11 other U.S. companies, and two Canadian companies.

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Technology Transfer and Economic Development**

- The aggregated capabilities of CADD, along with those of the UI Division of Pharmaceutical Service and the CBB, comprise a State asset that offers a unique research and development partnership with the pharmaceutical and biotechnology industry.
- CADD exposes UI undergraduate student employees in the sciences to current Good Manufacturing Practices and current Good Laboratory Practices (cGMP/cGLP). cGMP/cGLP experience is a sought-after skill in the pharmaceutical industry or any FDA compliant laboratory.
- The number of CADD clients declined from 32 to 26 but the fee income increased by 35% to nearly \$1.5 million in FY2004.

The UI National Advanced Driving Simulator's (NADS) primary mission for the U.S. Department of Transportation is to obtain fundamental understanding of ground vehicle crash avoidance maneuvers, determine limits of operator performance, and improve vehicle design and highway systems to enhance driving safety. A second mission is to conduct research with government and industry to enhance auto manufacturing productivity.

- NADS recently completed two studies of particular relevance to Iowa: a study of electronic stability control (ESC) for vehicles and a study of driver distraction caused by using wireless phones. The ESC study for a major industrial client examined the effects of an active stability control system during loss of vehicle control. The wireless phone study investigated whether hands-free operation and/or voice-activated dialing reduce the distraction potential associated with wireless phone use while driving. The study also assessed the impact of the conversation content on distraction.
- Funding was awarded in FY2004 for studies of visual contrast sensitivity on driving performance, issues associated with older and younger drivers, effectiveness of collision warning systems, several studies of pharmaceutical effects on driving performance, and driving impairment at various blood alcohol levels.
- NADS conducted projects funded by two major agricultural and construction equipment companies, and entered into an Educational Partnership Agreement with the Army RDECOM.

C. Creation of Economic Opportunities through Research and Scholarship

At UI, the University of Iowa Research Foundation is responsible for managing intellectual property arising from UI research. This includes receiving invention disclosures, seeking patent protection and negotiating license and option agreements.

**University of Iowa
Technology Transfer and Economic Development**

The University of Iowa Research Foundation aggressively manages intellectual property arising from UI research activities and seeks opportunities to license inventions to Iowa companies including startups. UIRF income not only supports its own budget but also supports UI research initiatives and temporarily provides essential operating budget support for the TIC business incubator and ORP. Details of the FY2004 UIRF activities are provided below and in the Appendix.

Among the FY2004 UIRF highlights:

- A record high 118 U.S. Patent applications (previous high was 101).
- A record high 47 options/licenses executed (previous high was 44).
- A record high 46 patents issued (previous high was 43).
- A record high \$1.98 million in patent cost reimbursements (previous high was \$1.43 million).
- A record high \$10,734,275 in earnings (previous high was \$8,762,838).
- Support for 125 clinical trials agreements negotiated by the Division of Sponsored Programs and the Clinical Trials Office.

- Among the most prominent technology transfer successes at UI is the patented CMV Promoter for Increased Protein Expression, licensed to 94 industrial partners (up from 79 in FY2003). Mark F. Stinski, UI professor of microbiology, discovered the significance of the CMV promoter. It is a widely used tool in the biotechnology industry, gaining importance in the commercial setting to manufacture bioengineered drugs, and is being used in the development of gene therapy and DNA vaccine products. Five CMV-based drugs have FDA approval and are currently used to treat patients with cancer and other diseases. A sixth product has been approved for patient use overseas.

- A series of patent applications was licensed to Sirna Therapeutics to develop a new class of therapeutic products to treat neurological diseases, including Alzheimer's Disease and Huntington's Disease. This invention was discovered in part by Beverly Davidson, UI associate professor of internal medicine, and Henry Paulson, UI associate professor of neurology.

- The UIRF executed an exclusive license with OvaMed covering Germany and other parts of Europe for the prevention and treatment of gastroenterology and hepatology diseases. The licensed technology provides for the administration of parasitic helminthes to humans. OvaMed is seeking regulatory approval to sell the parasitic helminthes as a treatment for Crohn's Disease and Ulcerative Colitis. The invention was discovered by Joel Weinstock and David Elliott, UI professors of internal medicine.

**University of Iowa
Technology Transfer and Economic Development**

	FY 2004		
	ISU	SUI	UNI
1. number of disclosures of intellectual property		86	
2. number of patent applications filed		118	
3. number of patents issued		46	
4. number of license and option agreements executed on institutional intellectual property		47	
5. number of license and option agreements yielding income		164	
6. royalties/license fee income		\$10,734,275	
7. revenue to Iowa companies as a result of licensed technologies		\$740,779	
8. total sponsored funding		\$333,299,508	
9. sponsored funding for research		\$267,547,634	
10. Corporate-sponsored funding for research and economic development (excludes corporate philanthropy)		\$30,383,055	
11. Iowa special appropriations for economic development and technology transfer	\$2,369,617	\$247,638	\$362,217

	FY 2005 Appropriations		
12. Iowa special appropriations for economic development and technology transfer	\$2,363,557	\$247,005	\$361,291

In FY2004 the Biomedical Ventures Group was established to identify and encourage entrepreneurial opportunities in the health sciences and engineering. In the Carver College of Medicine, the Office of Economic and Business Development was established to provide a focus and single point of contact for economic development there. The colleges of Pharmacy, Liberal Arts and Sciences, Engineering and Business also established single points of contact for economic development.

D. Creation of Economic Opportunities through Outreach and Public Service

Direct Technical Assistance to Business and Entrepreneurs

The UI John Pappajohn Entrepreneurial Center served nearly 1,800 students in entrepreneurial courses during the year and received the 2004 National Model Program Award for Excellence in Entrepreneurship Education for

undergraduates. JPEC opened the Bedell Entrepreneurship Learning Laboratory in FY2004, a 10,000 square foot office facility with 17 suites for student entrepreneur teams to use in preparing business plans. The first group of student teams represented the colleges of Business, Engineering and Liberal Arts and Sciences. In conjunction with the UI Small Business Development Center, JPEC provided FasTrac New Venture Training to 68 entrepreneurs, provided individual mentoring to 100 entrepreneurs, collaborated with community colleges to deliver FasTrac training across the state, provided training to 136 Iowa high school teachers at five locations across the state, and offered on-campus summer programs to 67 Iowa youth.

The UI Small Business Development Center provided more than 3,800 hours of assistance including one-on-one technical business services to 375 small businesses. A partner in the National Small Business Compliance Alliance, the UI SBDC helps coordinate tax training to small businesses and entrepreneurs across Iowa in cooperation with community colleges and their SBDCs.

Direct Economic Development Assistance to Iowa Communities

UI has a wide range of programs that deliver services to Iowa communities throughout the State. UI delivers specialized human and public health services, works with Iowa communities to recruit primary care physicians, provides training and expertise to help Iowa communities solve problems and plan their futures, and strengthens cultural offerings all across Iowa by sharing arts and humanities resources with Iowans in their home towns. There is scarcely a city or hamlet anywhere in the State that did not benefit from this UI assistance in FY 2004. An extensive but by no means exhaustive listing of programs and activities is provided in Section E. Highlights that are not otherwise discussed in this report include:

- Specialized dental services delivered throughout the State (College of Dentistry).
- Specialized legal programs for government agencies, non-governmental organizations, businesses and individuals with disabilities or special needs delivered in 14 counties (College of Law/Law, Health Policy and Disability Center).
- Community assistance in 31 counties to recruit primary care physicians (Carver College of Medicine).
- Specialized training to hospital nursing staffs in 11 counties (College of Nursing)
- Provided scientific expertise to communities in five counties to assist with cultural, historical and archeological sites and attractions (Geoscience and the Office of the State Archaeologist).
- Provided music therapy services to 16 care centers in three counties (Music Therapy).
- Brought arts programming to communities in 34 counties (ArtsShare).

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- Delivered training to businesses and government agencies in four counties and to the State to encourage workforce diversity and multicultural opportunities (Social Work).
- Provided an international-writer-in-residence for programs in public schools in 11 counties (International Programs).
- Offered 35 law clinics statewide to serve community non-profit organizations (Iowa Nonprofit Resource Center).
- Workshop on communicating scientific research to local policy makers (Public Policy Center)
- Advanced snowplow and winter anti-icing design/engineering for Henderson Manufacturing of Manchester (Public Policy Center and College of Engineering)
- Iowa Department of Management (Revenue Forecasting Internal Workgroup) and Iowa Council of Economic Advisors (Institute for Economic Research, Tippie College of Business).
- Specialized testing of potentially toxic materials for Alliant Energy, CDS Fulfillment, Des Moines Register, Rockwell Collins and Maytag, and other services for 943 communities in 99 Iowa counties (University Hygienic Laboratory).
- Conducted institutes and provided training to build leadership skills in communities in 41 Iowa counties (Institute of Public Affairs).
- Undertook projects with 68 Iowa companies and 23 government agencies in 26 counties in Iowa (College of Engineering).
- Performed 500 medical screenings at the Iowa Army Ammunition Plant in Burlington, community-based rural health improvement in Iowa and Keokuk counties, Iowa Cancer Registry and Iowa Birth Defects Registry to track disease and defects in all 99 counties, Great Plains Center for Agricultural Health to reduce agricultural illnesses and injuries, WORKSAFE IOWA health and safety consultations for 41 businesses and industries, and much more (College of Public Health).
- 756 students in the MBA for Professionals and Managers graduate degree program in Des Moines/Newton, Quad Cities and Cedar Rapids (Tippie School of Management, College of Business).

Economic Development Services Provided by the Oakdale Research Park

The UI Oakdale Research Park (ORP) and the affiliated UI Technology Innovation Center (TIC) business incubator are physically located on the UI Oakdale Research Campus in Coralville. Corporate tenants on the Park typically require sustained relationships with UI in the form of access to specialized research facilities, research faculty consultation, opportunity for research collaboration, access to a pool of student interns and part-time employees, opportunity to do business in a research park environment, proximity to intellectual property licensing opportunities, among others. Corporate tenants in the TIC incubator share many requirements of the larger and more established Park companies, but early-stage TIC firms seek cost-effective office and laboratory space and shared office services in an “incubator” environment. New

technology ventures often require individual assistance with business planning, establishing UI research relationships, identifying professional service providers, introductions to local and state government agencies and the regional business community, help in identifying potential sources of investment and other funding, communications and others on a case-by-case basis. The Park and the TIC incubator are major programs by which UI encourages new “spin-offs” from its research and other new technology ventures in the State, and also by which new and growing technology ventures are recruited to the State.

The UI Park and TIC incubator are open to any business venture in or outside the State that has a technology focus and satisfies the applicable eligibility criteria or guidelines. There are no TIC restrictions on tenants when they “graduate” from the incubator; therefore those companies are free to locate wherever it is best for their business. Most but not all TIC graduates have chosen to locate in Cedar Rapids, Coralville, Iowa City or North Liberty but others have established a presence in Davenport, Des Moines and Lowden. Because of its proximity to Interstates 80 and 380 and Highways 1, 6 and 965 companies and UI anchor laboratories at Oakdale reported a labor shed that covered 22 Iowa counties and 83 cities and towns in FY2004, representing more than one-fifth of the State.

E. Collaboration for Economic Development

Workforce Development

UI engaged in extensive workforce development and retention efforts in FY2004 and planned sustained workforce development efforts for FY2005.

Consider Iowa Program

“Consider Iowa” is a new series of discussion forums launched in Fall 2003 by the Office of Corporate Partnerships, UI Career Center, Engineering Career Services, Technology Innovation Center and Oakdale Research Park. The purpose of this program is to inform UI students of exciting career opportunities in Iowa and provide companies with the opportunity to learn more about university resources and programs as well as products and services of other Iowa businesses.

- The first Consider Iowa Forum focused on biotechnology and attracted 29 UI student participants for panel presentations by area industry, public sector and student intern representatives.
- UI established the Consider Iowa Internship Program to encourage UI students to gain meaningful work experience with area technology companies and to provide the small companies with productive work. UI provided financial support for approved internships with qualified companies.
- During Spring Break 2004, 30 UI students toured Kemin Foods, L.C. and Science Center of Iowa in Des Moines and were eligible to earn 1 sh academic credit. A tour of Hematech/Trans Ova Genetics in Sioux Center was planned but was

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cancelled due to unsafe winter driving conditions (See Summer 2005 Road Trip).

- Spring Break 2005 will feature an Industry Forum on biotechnology at Indian Hills Community College and will involve 30 - 35 UI and Community College students who will be eligible to earn 1 sh academic credit. The group will tour Indian Hills Bioprocess Training Center and the Iowa Bioprocessing Center in Eddyville (Cargill, Wacker Biochem Corp., Ajinomoto and others) followed by a tour of Kemin Industries and the Iowa Science Center in Des Moines.
- In summer 2005 an estimated 30-35 students will participate in a presentation and tour of Fort Dodge Animal Health followed the next day by an industry panel forum at the Northwest Iowa Community College in Sheldon featuring panelists from northwest Iowa companies. Students will then travel to Sioux Center and tour Hematech/Trans Ova Genetics. Student participants will be eligible to earn 1 sh hour credit.

Highlighting Emerging Careers to High School Students

In April 2004 UI's Office of Corporate Partnerships (OCP) facilitated a one-day program for Kirkwood Community College Workplace Learning Connection students from area high schools to visit with emerging Iowa companies and UI Centers of excellence. Approximately 30 junior and seniors participated in the program and toured UI spin off companies Integrated DNA Technologies and Breakthrough to Literacy, as well as the National Advanced Driving Simulator and UI Hygienic Lab. This program is expected to become an annual spring event. The April 2005 Entrepreneurial Day will serve to introduce students to area entrepreneurs.

Human Resource Recruitment Consortium

The Office of Corporate Partnerships serves on the advisory board of IDED's Human Resource Recruitment Consortium. HRRC is a private and public collaborative initiative to recruit Iowa college graduates back to the state and increase the number of skilled workers in Iowa. Over the past four years, OCP staff participated in the Governor's Alumni Receptions, joining representatives from ISU, UNI, Iowa's private colleges and most particularly the UI Alumni Association. Recruiting events have been held in Chicago, Minneapolis, Washington D.C., Los Angeles, San Diego, Phoenix and Toronto while an annual statewide job fair is presented each winter in Des Moines.

Business Recruitment

During FY04 the UI engaged in the active recruitment of more than 35 businesses to Iowa. UI participants included senior administrators, faculty and scientific research staff and professional staff of economic development/technology transfer units. More than half of the business recruitment prospects were out-of-state or international companies, and were collaborative efforts with the Iowa Department of Economic Development, Iowa City Area Development Group and Priority One (Cedar Rapids) development professionals.

Individual business recruitment projects typically unfold over many months or sometimes years. One example is a biotechnology company from a southeastern state that became the focus of an IDED-led recruitment effort in early FY04. An important factor in this recruitment was the unique set of assets present at the UI including the Carver College

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of Medicine, College of Pharmacy, University of Iowa Hospitals & Clinics, Center for Biocatalysis and Bioprocessing, Center for Advanced Drug Development, Division of Pharmaceutical Service, Clinical Trials Office, Technology Innovation Center business incubator and Oakdale Research Park. The prospect company was particularly encouraged by the UI plans to establish a State-funded cGMP facility in the Center for Biocatalysis and Bioprocessing to produce biological materials for clinical human use, and to establish a laboratory incubator facility for new and growing biotechnology companies. The recruited company was interested in the UI Oakdale Research Park for an R & D facility, but with IDED leadership also explored other areas of the State including Cedar Rapids, Keokuk, Eddyville and Muscatine as potential sites for a major manufacturing facility. The comprehensive recruiting initiative involved economic development professionals in each of those communities.

State Biotechnology Marketing Initiatives

For more than a decade UI has been a partner with the Iowa Department of Economic Development and ISU in a major, sustained, strategic State presence at the annual international convention of the Biotechnology Industry Organization. In recent years they have been joined by regional economic development professionals and the Iowa Biotechnology Association to give Iowa an even stronger marketing presence at the world's leading biotech industry conference. Over the years, UI has been represented by the Office of Corporate Partnerships, Oakdale Research Park, Center for Biocatalysis and Bioprocessing, Division of Pharmaceutical Service and College of Pharmacy. UI spin off companies including Integrated DNA Technologies and EnzyMed have also participated. UI's annual participation at BIO, in San Francisco in FY2004 and to be held in Philadelphia in FY2005, is costly in terms of effort, staff time and expense and its value to the State should regularly be re-evaluated. The State's considerable investment in sustaining its BIO presence since the early 1990s is believed to have given Iowa greater visibility in the biotechnology industry that may eventually yield dividends, although measurable results are few to this point.

Bioscience Pathway for Development

In FY2004 UI partially funded a broad-based initiative led by the Iowa Department of Economic Development in cooperation with the Board of Regents, State of Iowa to engage the consultant Battelle Memorial Institute to assess Regent university bioscience strengths and recommend infrastructure needed to accelerate growth of the bioscience industry in Iowa. UI invested \$50,000 in the Battelle project. The planning exercise also involved UNI, ISU, commodity groups, farm organizations, private and investor-owned utilities, business associations, local economic development professionals, venture capital firms, area community colleges and the Iowa Department of Education. In addition to identifying research strengths and infrastructure shortcomings, Battelle proposed a ten-year implementation plan that will require \$278,125,000 in State funding from bond financing and general fund appropriations.

New Opportunities for UI/Community Relationships

UI persistence in reaching out to businesses and communities across the State is leading to new opportunities for important relationships that match UI research expertise with needs in Iowa communities and businesses. One example is Henderson Manufacturing Company of Manchester in Delaware County. During a visit to Manchester, staff of the UI Office of Corporate Partnerships identified the potential for linking UI engineering expertise with Henderson Manufacturing, which builds truck boxes and snowplows. In FY04 a promising relationship began, matching faculty and

researchers from the UI College of Engineering and Public Policy Center with company personnel to work on design improvements and grant writing, and to function as a sounding board for ideas. The Henderson Manufacturing/UI collaboration is in its infancy, but promises to be a lasting and productive one.

F. Collaboration for Economic Development

In preparing the response to section E, UI elected to employ a broad definition of economic development projects. UI and universities in general have a very limited role in the direct creation of jobs. UI does, however, provide lowans with a wide range of education, training, support and infrastructure that enables economic development to grow businesses and build communities, including important contributions to quality of life issues (e.g. cultural activities and health care services) important to a business's employees. Many of those UI activities are reported here.

- G. Please briefly describe the relationship of your institution's economic development activities to the enhancement of economic growth in the state.** This description should cover, but should not necessarily be limited to, the following:
- the relationship between institutional activities and creation of jobs in Iowa;
 - institutional activities and services which indirectly promote economic development, such as training provided to staff of local economic development agencies.

Enhancement of Economic Growth through Job Creation and Retention, Investments, Sales, and Cost Savings

Iowa State University engages in several activities that have direct impact on both the creation as well as the retention of jobs in Iowa. The IPRT (Institute for Physical Research and Technology) Company Assistance Program interacts with numerous companies across Iowa each year. In addition, the Center for Industrial Research and Service (CIRAS), the Small Business Development Center (SBDC), and the Iowa Manufacturing Extension Partnership (IMEP) also interact with companies in solving their production and management problems. These interactions lead to the resolution of problems related to product development and business management. As a consequence of the improved production resulting from these interactions, businesses have been able to retain and often expand their work force rather than lay off workers due to the expected down turn in business if no solution to the problems had been found. More than 180 jobs have been created or retained during FY04 as a result of these activities.

The ISU Research Park has been very successful in initiating as well as nurturing numerous new businesses. Five new companies and affiliates have joined the Park in FY04, bringing the historical total to 139 companies. Currently, there are 48 companies located in the park, employing over 750 people.

A study by an ISU economist for the ISU Research Park suggests there is a substantial and diverse set of economic activity located at the ISU Research Park whose effects link strongly with the Iowa economy. The study, conducted 2002/2003, focused on current tenants at the Park, indicated that tenants contribute both directly and indirectly to \$134.2 million in total industrial output of firms in the state.

Wages paid by Research Park companies exceeds \$36.7 million annually, with an additional \$16.9 million in wages generated by businesses providing goods and services to Research Park companies and its employees. At the time of the study, the Research Park tenant companies employed over 900 people. Another 639 jobs are generated by

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businesses providing goods and services to the companies and its employees. The average wage per worker at the Research Park exceeds \$40,000. The average wage calculation includes students employed within the Research Park. The economic activity generated by Research Park tenants generates an estimated \$3.7 million in state tax income and another \$1.4 million in state charges and miscellaneous revenues annually.

As a result of the activities of IMEP, 170 companies in Iowa reported \$32 million in new investments during the last four quarters, as well as \$167 million in sales gains. IPRT reports more than \$1.5 million in retained sales from 9 of the companies that were served in FY04. New technologies originating at ISU and licensed to Iowa companies have resulted in \$18.7 million in sales by those companies in calendar year 2003. Total sales of ISURF-licensed technologies were \$68.7 million, not including germplasm. The overall impact of IPRT Company Assistance programs is estimated at \$20.5 million, leveraged from an investment of \$800,000.

Cost savings to existing Iowa companies are an important result of the activities of IMEP and IPRT Company Assistance. Eight manufacturers that collaborated with IPRT reported one-time cost savings of more than \$1.22 million, and 170 companies served by IMEP reported a total of over \$27.5 million on cost savings. These activities greatly enhance the competitiveness of Iowa business and industry.

H. Creation of Economic Opportunities through Research and Scholarship

Please fill in the blanks in the table below with figures for FY 2004			
	FY 2004		
	ISU	UI	UNI
1. number of disclosures of intellectual property	110		
2. number of patent applications filed	52		
3. number of patents issued	27		
4. number of license and option agreements executed on institutional intellectual property	166		
5. number of license and option agreements yielding income	362		
6. royalties/license fee income	\$2,800,000		
7. revenue to Iowa companies as a result of licensed technologies	\$18,000,000		
8. total sponsored funding	\$274,217,384		
9. sponsored funding for research	\$163,075,683		
10. Corporate-sponsored funding for	\$25,254,584		

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research and economic development (excludes corporate philanthropy)			
11. Iowa special appropriations for economic development and technology transfer	\$2,369,617	\$247,638	\$362,217

	FY 2005 Appropriations		
12. Iowa special appropriations for economic development and technology transfer	\$2,363,557	\$247,005	\$361,291

I. Creation of Economic Opportunities through Outreach and Public Service

Please describe the ways in which your institution is engaged in the following activities (For example, What is the nature of the outreach and service activities? Which units provide it? What kinds of people and organizations benefit?):

- direct and hands-on technical assistance to businesses and entrepreneurs
- direct economic development assistance to Iowa communities
- economic development services provided by the research parks

C.1 The Economic Development and Technology Transfer Network at Iowa State University

Iowa State University, as part of the higher education system in the State, is charged with advancing economic development and technology transfer activities that promote growth and benefit all citizens. Specifically, Section 176A.2 of the Code of Iowa states that one of the expectations for the university is “disseminating among the people of Iowa useful and practical information on subjects relating to agriculture, home economics, and community and economic development...” While creation of knowledge (research and scholarship) remains the basic responsibility of a research university, the way we share knowledge and expertise determines the successful land grant institution. ISU shares knowledge and expertise with students (learning and teaching), communities (engagement), and business and industry (technology transfer and economic development). ISU ranks as one of the most successful universities nationwide in several categories of technology transfer and economic development. The University evolves these goals by contributing to workforce development, creating intellectual property, advancing ideas to the stage of market readiness, supporting creation of new companies, offering assistance to existing companies,

and attracting new companies to the State. The fuel that powers the technology transfer system, intellectual property, results from the efforts of faculty in the University's colleges and research centers. In turn, these inventions and ideas provide new business opportunities for existing companies as well as the basis for creating new companies.

The technology transfer process is initiated through the generation of discoveries in the laboratories of the University's departments, colleges, research centers and institutes. These include the Institute for Physical Research and Technology, the Plant Sciences Institute, the Biotechnology Program, the Center for Transportation Research and Education and other centers and institutes, such as the statewide Iowa Energy Center and the Iowa State Water Resources Research Institute. The resulting intellectual property and the interactions with Iowa's new and existing businesses contribute to Iowa's economic development through the efforts of the ISU Research Foundation, the Office of Intellectual Property and Technology Transfer, the Institute for Physical Research and Technology, the Pappajohn Center for Entrepreneurship, the Small Business Development Center, the ISU Research Park, the Center for Industrial Research and Service, and the Iowa Manufacturing Extension Partnership.

The activities of the colleges, institutes and centers are coordinated through the Coordinating Council on Technology Transfer (CCOTT) that advises the Vice Provost for Research in all matters related to technology transfer and economic development. The Vice Provost and CCOTT continuously communicate with economic development entities within the State such as the Iowa Department of Economic Development, the Iowa Business Council, the Greater Des Moines Partnership and other local and regional agencies.

Functions of the ISU System for Innovation include:

- **Business Development & Assistance:** Business Development and Assistance activities have a primary focus on new businesses. These functions are represented by several units on campus. Efforts related to start-up companies, business assistance services & SBIR/STTR applications are coordinated by this group to provide a consistent message to potential and new start-up companies as well as efficient, effective assistance. A second focus of this group is business assistance provided to existing companies in the same effective, efficient manner and to appropriately identify which ISU unit should take the lead on providing the service.
- **Technical Assistance and Technology Development:** Technical Assistance and Technology Development activities have a primary focus on existing business – solving technical problems and assisting in product development and process improvement projects. This includes efforts of no-cost technical assistance, and cost-sharing projects. Again, these functions are represented by several units on campus.

Iowa State University Technology Transfer and Economic Development

- **Industry Relations:** Industry Relations activities have a primary focus of facilitating interactions and managing research relationships with new companies (customers), companies funding basic research projects, economic development groups, legislative groups, and other third parties that interact with ISU on economic development issues.
- **Community Development:** Community Development activities have a primary mission of knowledge distribution and interacting with communities, including community development groups, school districts, and other local agencies. ISU Extension has been a significant player in this area with its programs linked to Extension to Communities, Families, Business and Industry.
- **Workforce Development and Educational Programs:** Workforce Development and Educational Programs have a primary mission of identifying new training needs, tracking existing efforts, and coordinating with community colleges to effectively deliver and visibly demonstrate the value of these activities.
- **Intellectual Property:** Intellectual property activities include invention disclosures, patents and licensing, copyright, appropriate dissemination of IP during industry and community interactions. These functions are served by the ISU Research Foundation and are components of the overall activities mentioned above.
- **Research Units:** When talking about capacity and commitment to engagement and service, it is crucial to keep in mind that all departments, colleges, centers, and institutes involved in research are a critical component. ISU continues its forward-thinking and strategic planning to identify the next wave of opportunities of research platforms that will be key to Iowa's economy. These units, on the forefront of research, provide the direction the above teams emphasize and direct resources toward.
- **Research Facilities:** Iowa State University maintains many central research facilities that also serve communities and businesses on a fee-for-service basis. These facilities include the Biomass Energy Conversion Center (BECON, affiliated with the Iowa Energy Center), biotechnology laboratories, laboratories of the Plant Sciences Institute and the Center for Crops Utilization Research, as well as survey facilities of the Center for Survey Science and Methodology, and others.

C.2 ISU's Key Units engaged in Economic Development

Iowa State University, as part of the higher education system in the State, is charged with advancing technology transfer and economic development activities that promote growth and benefit all citizens. The University evolves these goals by contributing to workforce development, creating intellectual property, advancing ideas to the stage of market readiness, supporting creation of new companies, offering assistance to existing companies, and attracting new companies to the State. The University's economic development/technology

transfer support system includes the following units that are coordinated through the Coordinating Council on Technology Transfer:

- Institute for Physical Research and Technology (IPRT): IPRT and its Company Assistance unit play an integral role in the process of technology transfer targeted at new business creation. It provides funding for technology development by providing economic support that focuses technology development on real world applications. Application of technology moves research toward products and markets, the foundation of any potential business. IPRT also provides assistance to Iowa companies with SBIR (Small Business Innovation Research) and STTR (Small Business Technology Transfer) applications.

- Pappajohn Center for Entrepreneurship and the Small Business Development Center (SBDC): These units work with researchers to define the technologists' role in the company, evaluate markets, assist in the creation of a business plan and help the company develop connections with accountants, attorneys and investors. In a typical year, the Pappajohn Center, working with IPRT, the Plant Sciences Institute and other research centers, identifies approximately 25 prospective new technologies. These technologies can take 6 to 26 months to develop sufficiently to justify the formation of businesses. During this time the researcher receives assistance in moving the technology from the researcher's bench to the marketplace. The Pappajohn Center helps the researcher develop the model for the business and establish the network of resources necessary to implement the plan. These resources can include business assistance, students or capital. The Pappajohn Center/SBDC also continues to provide a referral network and facilitates the recruitment of students including access to internships.

- Iowa State Innovation System (ISIS): Near the time a venture is launched, facilities become an issue. ISIS, ISU's technology incubator, provides an ideal first home for companies. ISIS offers connections to the University, affordable space with reception services, office equipment (copiers, fax machines, and computers), conference rooms, and other amenities at a very reasonable rate. The Pappajohn Center, described above, provides mentoring to the companies as well as the opportunity for companies to utilize students as interns and researchers. ISIS will generally attract five new companies each year. Companies typically spend one to three years in the Incubator moving from product development to product sales. Once sales are established, companies grow out of the Incubator. Some companies remain within the Research Park and continue to receive development assistance, while others move on to commercial space elsewhere. As companies mature, the University provides opportunities for collaboration between researchers at the University and in the companies. Students provide cost-effective labor and are potential employees. The Research Park provides expansion space, often financing the space and improvements.

- Iowa State University Research Park: The Iowa State University Research Park is a 230-acre development with nearly 325,000 square feet of building space and is located south of the Iowa State University campus. The ISU Research Park is more than just land and buildings; it is a technology community that encourages commercialization of University research.
- Center for Industrial Research and Service (CIRAS): CIRAS provides technical support to Iowa companies in all 99 counties by developing products, improving fabrication and by testing products to increase competitiveness. It helps companies create and/or retain jobs and it saves companies money by offering solutions to problems with plant layout and/or manufacturing techniques.
- Iowa Manufacturing Extension Partnership (IMEP): The Iowa Manufacturing Extension Partnership (IMEP) is an affiliate of the National Institute of Standards and Technology (NIST) Manufacturing Extension Partnership (MEP). IMEP is administered under the Iowa State University Extension Service, and IMEP management is directed by the Industry Governance Board (IGB), a group composed of industry leaders from both small and large manufacturers across the state of Iowa. IMEP works directly with area manufacturers to provide expertise and services tailored to their critical needs, which range from process improvements and worker training to business practices and applications of information technology. Solutions are offered through a combination of direct assistance from center staff and outside consultants.
- ISU Research Foundation (ISURF): ISURF manages the intellectual property for Iowa State University. It works with faculty members in regard to disclosures and patents, and then it works with companies to license those technologies. It also funds projects within the University that have potential for intellectual property.

J. Collaboration for Economic Development

Please briefly describe two or three examples of *major economic development collaborative projects* with such other entities as Regent universities, Iowa community colleges, the Iowa Department of Economic Development, Iowa Workforce Development, or other state agencies.

Major Economic Development Collaborative Projects

Biologics Facility – ISU has embarked on a significant effort to initiate the biopharming industry in Iowa through the establishment of a Biologics Facility

that can be used to extract critical proteins from plants, proteins that have significant pharmaceutical, nutraceutical, and/or industrial applications. This project has now received significant support from the State, federal programs, and the Iowa Values Fund. Efforts are being made to obtain the remainder of the funds required to complete the project through debt financing.

International Economic Development Initiatives: Korea and New Zealand -

During the past year considerable progress has been made in recruiting companies from South Korea and New Zealand to Iowa and the Research Park. This effort has focused on attracting companies interested in expanding their businesses to North America. This program has been undertaken together with the Iowa Department of Economic Development and the Greater Des Moines Partnership. The New Zealand initiative began with the visit of an Iowa delegation to New Zealand led by Governor Vilsack. Following a return visit by a New Zealand delegation to Iowa and follow-up visits by specific businesses, a New Zealand company recently committed to join the ISU Research Park.

The continuation of the Korean initiative has resulted in the purchase of a factory in Grinnell by one of the major food companies in Korea, Pulmuone. This company already has announced publicly that it is planning a significant expansion of its operation in Iowa. Another biotech company has made a verbal commitment to come to the Research Park, and there are very serious discussions underway with two high tech engineering firms interested in initiating their North American business ventures from the Research Park.

Implementation of the Battelle Report – The Iowa Department of Economic Development commissioned the Battelle Institute to generate an economic development plan for the State of Iowa based on specific areas of expertise in the biosciences identified in the Regents' universities as well as in the private sector. The Regents' universities participated extensively in facilitating Battelle's study through interactions on campus as well as through active discussions with the Board of Regents and the Iowa Department of Economic Development. This study identified six key areas for future emphasis. Three of these areas will be hosted at ISU. The Office of the Vice Provost for Research currently is participating actively in the processes related to implementing the roadmap proposed by Battelle, including preparations required to present the program to the Legislature.

K. Collaboration for Economic Development

A table of the institution's economic development projects in Iowa, including:

- a project descriptor, a brief narrative description of the project (one or two sentences);
- Iowa city or cities where this project occurs;
- names of businesses, entities served .

See Attached.

**University of Northern Iowa
Economic Development/Technology Transfer – BOR Report Outline**

A. Enhancing Economic Activity in Iowa

The University of Northern Iowa is an active participant in efforts to enhance economic activity in the state of Iowa. Four primary economic development activity areas at UNI are business incubation/acceleration, hands-on technical assistance to local economic development groups, market research for Iowa companies, and intellectual property development and commercialization initiatives.

Incubation and business accelerator services are provided by UNI's Regional Business Center. Seven incubator suites are available for entrepreneurs in the downtown Waterloo facility. During its three years of operation, the Center has graduated seven businesses that now occupy nearly 17,000 square feet of commercial office space, primarily in downtown Waterloo. Virtual incubator services are also provided to eight rural counties via the MyEntreNet program. The two incubator programs have launched 46 new ventures which in turn have created more than 154 jobs.

Professional market research services are delivered to Iowa's larger companies through the Strategic Marketing Services (SMS). This UNI outreach program provides targeted market research, which has resulted in companies attracting new customers, expanding markets and sales, and job creation. Companies using the services of SMS report an average increase in employment of 16%.

UNI's Institute for Decision Making (IDM) assists local economic development groups with various types of development projects. During its 16-year history, IDM has helped nearly one-half of Iowa's communities with hands-on, action-oriented economic development assistance. Local development groups report more than one thousand jobs per year are created as an indirect result of IDM's technical guidance. IDM also contributes to the economic development efforts of Iowa communities through its emphasis program of study in community economic development. Via this program, UNI has contributed at least fifteen entry-level economic developers for Iowa's communities.

At UNI, outreach and economic development activities are managed through its Business and Community Services Division (BCS). BCS emphasizes hands-on technical assistance to businesses and communities to meet the individual needs of each client. UNI's economic development activities also create opportunities for students and faculty to actively participate in economic, community, and business development projects throughout Iowa, even as they address the practical problems facing businesses and communities. In aggregate, UNI outreach programs in technology transfer and business/community development activities have collectively served nearly 3,500 businesses/entrepreneurs and 457 community clients, involving approximately 32,600 employees and community leaders in all 99 of Iowa's counties. UNI outreach programs have provided opportunities for 1,010 students and 90 faculty members to actively participate in economic development and tech transfer projects in the past year.

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UNI Research Foundation (UNIRF): The UNIRF is the incorporated unit through which UNI intellectual policies are managed, and profits from intellectual properties are received, disbursed and managed. The UNI Intellectual Property Committee was created in 1998 to more actively engage faculty and staff in patenting, trademarking, copyrighting and licensing technologies developed at UNI. The UNIRF has made an equity investment in two University-launched ventures and has funded market research and advanced lab testing for two additional projects with exciting potential for commercial application

B. Creation of Economic Opportunities through Research and Scholarship

	FY 2004		
	ISU	UI	UNI
1. number of disclosures of intellectual property			3
2. number of patent applications filed			3
3. number of patents issued			2
4. number of license and option agreements executed on institutional intellectual property			1
5. number of license and option agreements yielding income			5
6. royalties/license fee income			\$25,695
7. revenue to Iowa companies as a result of licensed technologies			\$2,660,000
8. total sponsored funding			\$23,735,500
9. sponsored funding for research			\$2,433,400
10. Corporate-sponsored funding for research and economic development and revenue generation (excludes corporate philanthropy)			\$1,756,800
11. Iowa special appropriations for economic development and technology transfer	\$2,369,617	\$247,638	\$362,217
	FY 2005 Appropriations		
12. Iowa special appropriations for economic development and technology transfer	\$2,363,557	\$247,005	\$361,291

C. Creating Economic Opportunities through Outreach and Public Service

It has become more widely espoused nationally that universities provide the technological and innovation feedstock that propel industrial and entrepreneurial growth. It takes technology transfer to drive this innovation, however. UNI has taken numerous strides this past year to improve our technology transfer process, making it more seamless for faculty researchers and private industry.

Our technical assistance focuses on our niche strengths within the University: Community and Economic Development, Market Research, Environment, Metal Casting, Management and Professional Development, New Iowans and Entrepreneurship. The programs that deliver our niche assistance comprise the University's Business and Community Services Division (BCS), emphasizing hands-on assistance to businesses and communities to meet the individual needs of each client. No state can truly reach its economic potential without building strong, healthy communities that foster and support business growth and a vibrant workforce. BCS programs, in cooperation with our University's academic departments, strive to deliver all three of these components: strong communities, business development and growth and a vibrant workforce. Unfortunately, as the state has disinvested from higher education and its economic development programs, the communities, future workers and businesses who need our assistance the most are frequently unable to afford the fee for service many of our programs are now forced to request.

UNI outreach services are provided through the Business and Community Services (BCS) division, which provides an integrated approach to meeting the needs of businesses, entrepreneurs and communities throughout Iowa. BCS serves as the one-stop entity for economic development services and provides an integrated approach to meeting the needs of businesses, entrepreneurs and communities throughout Iowa. Twelve separate outreach programs work to solve the problems of external constituents in the following UNI core competencies. Program outcomes for FY 2004 include the following:

- Market research and analysis services were provided to 18 Iowa companies by Strategic Marketing Services;
- Educational and technical advice related to the environment and environmentally sound practices was provided to 233 Iowa companies by the Iowa Waste Reduction Center;
- Hands-on community and economic development assistance and research provided by the Institute for Decision Making to 75 community partners in 2004 and during its 16-year history, has served more than 450 communities in nearly all of Iowa's counties. In addition, 35 economic impact analyses were provided to local development groups or local government entities for improved decision making;
- Specialized business management training provided by the Management and Professional Development Center in 59 workshops to 938 business professionals in 45 businesses during the past year;

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- Counseling and training was provided to more than 1,000 small businesses by the Regional Business Center and Small Business Development Center;
- Early stage angel/venture financing was provided to three new ventures by the Cedar Valley Venture Fund, an angel investment group organized and managed by the UNI John Pappajohn Entrepreneurial Center
- Biobased industrial lubricant development and performance testing is provided by the Ag-based Industrial Lubricants program (ABIL). To date, ABIL has developed 30 soy lubricants, greases, metalworking fluids and specialty products and formed a for-profit company to market soy-based industrial lubricants.);
- Metal casting technical assistance to stimulate increased productivity while maintaining compliance with environmental regulation is provided by the Metal Castings Center. During the past year, the MCC maintained active contracts with 11 companies, provided outreach projects to 12 Iowa foundries and problem solving to 20 additional foundries;
- Research project funding and outreach services related to recycling and reuse provided by the Recycling and Reuse Technology Transfer Center;
- Standardized mechanical, physical and chemical testing of metals, polymers and cementitious materials, was provided by the Materials Testing Service, which consisted of 72 separate tests and 13,000 hours of testing;
- Assistance to Iowa businesses and communities in accommodating the needs of newcomers is provided through direct technical assistance and by more than 22,000 copies of four different guides/manuals by the New Iowans Program;
- Energy efficiency and environmental assistance is provided to educational, civic institutions and businesses in 163 different communities by the Center for Energy and Environmental Education; and,
- Roadside vegetation research for restoring right-of-ways is provided by the Native Roadside Vegetation Center.

D. Collaborative projects

Coordination and collaboration are critical in today's quest for resources and for shared responsibility in implementation. UNI forms partnerships with other economic development service providers in Iowa, including the Iowa Department of Economic Development, Iowa Workforce Development, the Department of Natural Resources, Recycle Iowa, Iowa State University, the University of Iowa, USDA Rural Development, Governor Vilsack's office and community colleges. Six examples of joint projects we have pursued during the past year are summarized in the following paragraphs.

RRTTC – Collaboration with Organizations

The RRTTC has important working relationships with national and Iowa recycling industries, industry associations, governmental agencies and private citizens supportive of recycling in Iowa. These relationships include, but are not limited to, the Iowa Recycling Association, Iowa Waste Exchange, Iowa Society of Solid Waste

Operators, Beautify Iowa, the National Recycling Association and the Solid Waste Association of America.

Economic Impact for IDED, Utility Companies and Local Development Groups

IDM staff offered assistance to the Iowa Department of Economic Development staff, Iowa's utility companies and local communities by conducting 35 economic impact assessments for major development projects. Each economic impact analysis provided details of the impacts of sales, payroll and construction of the project and related impacts on other sectors of the area economy.

IWRC Partners with the Iowa DNR and IDED

The IWRC relies heavily on its partnerships with several state agencies, primarily the Iowa Department of Natural Resources (IDNR) and Iowa Department of Economic Development (IDED). The IDNR has been a resource for state regulatory guidance to ensure accurate information delivery, particularly for IWRC's Iowa Air Emissions Assistance Program. Many of IWRC's referrals come from IDNR field office inspectors who have discovered violations at small businesses. These businesses are advised to work with the IWRC to correct these violations in lieu of costly fines.

IDM Assists IWD to Improve the Delivery of Labor Market Information

The availability of labor market information is a critical component in Iowa's economic development efforts. In 2004, IDM continued to assist Iowa Workforce Development with its efforts to expand and enhance the use of labor market data by economic development organizations and businesses. IDM completed a survey and follow-up interviews of economic development professionals to identify how laborshed data is being used in their economic development activities. The survey results were used by IDM and IWD to develop *Laborshed Studies – Handbook for Understanding Workforce Availability*. This publication won the 2004 Labor Market Information (LMI) Communication Publication Award for a product or service for economic development from the National Association of State Workforce Agencies (NASWA) in July. IDM also used the survey and interview results to develop outlines for laborshed training modules for IWD that will help IWD staff, economic development professionals, human resource managers and others learn how to better utilize laborshed data.

In addition, IDM continued to assist IWD's Workforce Research Bureau with ongoing methodology enhancements to its laborshed analysis process. IDM worked with faculty and students from the UNI Math Department to update the laborshed workforce model that IWD utilizes to estimate a community's total available workforce. The model was developed at UNI and continues to be updated and enhanced to improve laborshed analyses.

ABIL Collaboration with ISU-CIRAS \ USDA

UNI-ABIL and Iowa State University's Center for Industrial Research and Service (ISU-CIRAS) have agreed to jointly cooperate in the development, commercialization and utilization of biobased products. Toward that end, ABIL supported CIRAS in their effort to collect data and product samples on renewable greases; to be tested by CIRAS for inclusion in their biobased products database. The CIRAS database is

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part of USDA's Federal Biobased Products Preferred Procurement Program (FB4P), supported by Section 9002 of the Farm Security and Rural Investment Act.

NRVC – Collaboration with Iowa Department of Transportation and USDA

The NRVC and the Iowa Department of Transportation work cooperatively to promote the Integrated Roadside Vegetation Management program throughout the state. Currently, the NRVC is conducting applied research projects on planting techniques and mixtures in the right-of-way for the Iowa DOT along Highway 20 in Black Hawk County.

The NRVC also provides native vegetation consultation and support to the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS). The NRVC has provided training workshops in Plant Identification and Introduction to Prescribed Burning for NRCS employees. In addition, the NRVC and the USDA's NRCS Plant Materials Center jointly release regional ecotypes of Source Identified Seed. The NRVC provides expertise and policy making consultation to the Iowa Crop Improvement Association in developing and implementing guidelines for Iowa Source Identified seed.

E. Client and Project Summary (supplied as a separate Excel spreadsheet)

F. Consequences of Reduced State Funding Support (supplemental summary)

General Assembly funding for four UNI outreach programs was either eliminated or drastically reduced for Fiscal Years 2002 through 2004. The following paragraphs describe the impact of these cuts.

A. Small Business Development Centers

The past three years of budget cuts to the statewide system of SBDCs have crippled the UNI SBDC and may have caused the closing of the Regional Business Center if not for a short-term federal grant received. As a result of the state budget cuts, one staff position was eliminated and two other positions were temporarily combined and may be eliminated upon completion of the federal grant (unless alternative funding is secured). The result will be one and one-half full-time staff persons at the UNI SBDC in an operation designed for four professional staff. The negative impact of the cuts has been immediate and difficult for clients and staff. For example, only seventeen workshops are scheduled for this fall, compared to 35 workshops conducted before the cuts. Outreach to rural clients has been severely curtailed, except for the counseling provided through the rural grant. Based upon requests for services in years prior to the budget cuts, the RBC would have expected over 1,300 small businesses to seek assistance this past year, but were able to serve about 500. Last spring, more than 50 would-be new clients faced a three-week or longer wait just for the initial consulting services, resulting in frustration for both clients and staff. All fees for classes and workshops have been raised substantially, which has effectively eliminated access to services for some of the SBDCs lower-income clients.

B. Applied Technical Assistance – Metal Castings Center

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The budgetary cut backs in the last few fiscal years by the state have severely impacted the Metal Casting Center's ability to perform services for the Iowa metal casting industry. The cuts have forced the center to restructure their operations, reducing 2.6 FTE in the P&S staff and 0.5 FTE in Merit staff. Of the P&S staff retained, 1.6 FTE will be funded for the current year from the fee-for-services and external grant funds with a permanent 1.0 FTE lost. This has placed a heavy burden on the Metal Casting Center to increase these services at a time of an unpredictable and unstable economy in addition to a reduction in availability of federal grants. As with other economic development/tech transfer programs impacted by cuts, the transition to fee-for-services has left those unable to afford it (small businesses) behind.

Not only has the reduction in personnel hurt the Metal Casting Center's ability to service the foundry industry, the supplies, equipment, travel expenses and necessary foundry supplies has decimated the center with a loss of over 80% of its funding from the recent cuts. There are no travel funds to provide assistance to the foundry industry. The greatest fear in this precarious financial situation is equipment breakdown or expensive repair costs. This could have a serious impact on the MCC's ability to support the state's foundry industry.

C. Research and Applied Research - UNI Ag-Based Industrial Lubricants Research Program

Due to Iowa's current economic climate and resulting funding cuts by both state agencies and associations, the ABIL Program is struggling to continue to offer the same quality of client support, while continuing to meet market acceptance objectives of soy products. Unfortunately, due to this lack of resources (both human and material), ABIL will need to minimize support services, while initiating a fee for others (i.e., technical support and training, laboratory and quality assurance testing and product sample fees). While these fees may not have a great impact upon its corporate clients, ABIL expects to see a reduction in participation from smaller, rural business clients who have, in the past, benefited from ABIL's support services (many of these businesses being Iowa-based and include farmers).

In addition, the publishing of a quarterly newsletter, the *ABIL Advocate* (circulation 7,500), will be reduced and offered in an electronic format to conserve funds. This newsletter has served as the cornerstone to the program's marketing efforts, and helped increased the market acceptance of biobased industrial products. Many clients and constituents ask to receive and appreciate this communication tool.

ABIL has found it necessary to reduce the number of cooperative partnerships specifically designed to explore new uses for soy products, due to this lack of resources. In most instances, these joint field projects often led to the adoption of soybean-based products. While federal funds are increasingly available for biobased product initiatives, ABIL has had to forego opportunities to bring these federal funds to Iowa due to lack of matching commitment. For instance, an application for a \$400,000 grant would, in most instances, require \$400,000 in matching commitment, but with only \$50,000 in state funds (VAAPFAP) this year; ABIL is unable to pursue these opportunities. Other states are able to do so, thus broadening the gap in Iowa's ability to compete in the Bioeconomy.

D. Community Assistance -Institute for Decision Making

The Institute for Decision Making (IDM), UNI's community economic development outreach program, had its state appropriations cut by 50% during 2002. This cut was in addition to the approximately 30% funding cut that occurred during the previous two years. IDM now operates on the equivalent of only 1/3 of its FY01 budget. Reductions of this magnitude have resulted in both fundamental changes to IDM and immediate impacts on its clients. Most noticeable is the reduction in IDM's professional staff, operations and student experiential learning opportunities funded by state monies. At least five positions have been eliminated or transferred to other programs and will not be available to provide direct economic development services to Iowa communities. Another impact includes longer lead times for community client sessions and the elimination of some technical assistance programs and services. In addition, IDM started charging fees for its technical assistance and seeking other sources of revenue to support its core services. Many of IDM's 450 clients are rural communities and they rely extensively on IDM's technical assistance and guidance for their community and economic development programs. This client base represents nearly one-half of the communities in Iowa that have relied on a Regent's technical assistance program to assist their local development efforts. Unfortunately, many rural communities, those who most desperately need hands-on community development assistance and once utilized these services, are no longer able to access IDM's assistance.